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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Appellant: GLOVER, JOHN N.	§	Art Unit: 1723
Filed: May 27, 1999	§	Primary Examiner: David L. Sorkin
Application No.: 09/320,950	§	Docket No.: 20781.004
For: FILTERING MEDIUM AND METHOD FOR CONTACTING SOLIDS CONTAINING FEEDS FOR CHEMICAL REACTORS	§	

APPEAL BRIEF
(under 37 C.F.R. § 41.37)

This is an appeal from the final rejection of Claims 59, 61 – 67, and 69 – 85 in the above referenced patent application. The Final Office Action was dated June 7, 2005. A Notice of Panel Decision from Pre-Appeal Brief Review was mailed to Appellant on January 12, 2006, setting forth that the application remains under appeal because there is at least one actual issue for appeal.

I. REAL PARTIES IN INTEREST

The inventor, John N. Glover, and the assignee, Crystaphase International, Inc., are the only real parties in interest with respect to the captioned patent application.

II. RELATED APPEALS AND INTERFERENCES

There are none.

III. STATUS OF CLAIMS

A. Status of the Claims

1. Claims cancelled: 1-58, 60 and 68.
2. Claims withdrawn (but not cancelled): None.
3. Claims pending: 59, 61-67 and 69-85.
4. Claims allowed: None.
5. Claims rejected: 59, 61-67 and 69-85.

B. Claims on Appeal

Claims 59, 61-67 and 69-85 are presently on appeal.

IV. STATUS OF AMENDMENTS

Claims 59, 61-67 and 69-85 were finally rejected in an Office Action dated June 07, 2005. Appellant filed an Amendment and Response Subsequent to Final Rejection on August 8, 2005. An Advisory Action was mailed to Appellant on August 29, 2005, advising Appellant that the Amendment and Response did not place the application in condition for allowance.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claims 59, 67 and 78 are independent claims. Claims 61-66, 79 and 82-83 are dependent upon Claim 59. Claims 69-77, 80 and 84-85 are dependent upon Claim 67. Claim 81 is dependent upon Claim 78. A summary of the subject matter of the independent claims currently on appeal is presented as follows:

Claim 59

The first independent claim, Claim 59, features a method of fluid distribution in a chemical reactor 22 comprising the steps of:

(A.) providing a layer 66, 68, 70 (FIG. 2) of a plurality of ceramic filter units 15 (FIGS. 4-16), at least some of the ceramic filter units 15 including a body having a substantially annular outer peripheral shape (FIGS 4-5), a central opening 108 extending through the body, and at least three elliptical openings 89 extending through the body and positioned between the central opening 108 and an outer periphery of the body so that a combination of the central opening 108 and the at least three elliptical openings 89 define a plurality of fluid flow passageways 87, 88, 89, 108 (FIGS. 4, 5, 14) extending through the at least some of the plurality of ceramic filter units 15;

(B.) contacting an organic-based feed stream 51 (FIG. 2) with the layer 66, 68, 70 of the plurality of ceramic filter units 15; and

(C.) subdividing the organic-based feed stream 51 into a plurality of smaller fluid streams by passing the organic-based feed stream 51 through the plurality of fluid flow passageways 87,

88, 89, 108 (FIGS. 4, 5, 14) prior to the organic-based feed stream 51 contacting a catalyst bed in the chemical reactor 22.

Claim 67

The second independent claim, Claim 67, features a method of fluid distribution in a chemical reactor 22 comprising the steps of:

(A.) providing a layer 66, 68, 70 (FIG. 2) of a plurality of ceramic filter units 15 (FIGS. 4-16), at least some of the ceramic filter units 15 including a body having a substantially polygonal outer peripheral shape (FIGS 4-5), a central opening 108 extending through the body, and at least three elliptical openings 89 extending through the body and positioned between the central opening 108 and an outer periphery of the body so that a combination of the central opening 108 and the at least three elliptical openings 89 define a plurality of fluid flow passageways 87, 88, 89, 108 (FIGS. 4, 5, 14) extending through the at least some of the plurality of ceramic filter units 15;

(B.) contacting an organic-based feed stream 51 (FIG. 2) with the layer 66, 68, 70 of the plurality of ceramic filter units 15; and

(C.) subdividing the organic-based feed stream 51 into a plurality of smaller fluid streams by passing the organic-based feed stream 51 through at least some of the plurality of fluid flow passageways 87, 88, 89, 108 (FIGS. 4, 5, 14) prior to the organic-based feed stream 51 contacting a catalyst bed in the chemical reactor 22.

Claim 78

The third independent claim, claim 78, features a method of fluid distribution in a chemical reactor comprising the steps of:

(A.) providing a layer 66, 68, 70 (FIG. 2) of a plurality of ceramic filter units 15 (FIGS. 4-16), at least some of the ceramic filter units 15 including a body, a central opening 108 extending through the body, and at least three elliptical openings 89 also extending through the body and positioned between the central opening 108 and an outer periphery of the body so that a combination of the central opening 108 and the at least three elliptical openings 89 define a plurality of fluid flow passageways 87, 88, 89, 108 (FIGS. 4, 5, 14) extending through each of the plurality of ceramic filter units 15;

(B.) contacting an organic-based feed stream 51 (FIG. 2) with the layer 66, 68, 70 of the plurality of ceramic filter units 15; and

(C.) subdividing the organic-based feed stream 51 into a plurality of smaller fluid streams by passing the organic-based feed stream 51 through the at least some of the plurality of fluid flow passageways 87, 88, 89, 108 prior to the organic-based feed stream 51 contacting a catalyst bed in the chemical reactor 22.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether Claims 59, 61-67 and 69-85 are unpatentable under 35 U.S.C. §103(a) for obviousness over Kramer (US 4,615,796) (hereinafter "Kramer") in view of "CE Refresher: Catalyst Engineering, Part 2" by John Fulton (hereinafter "Fulton").

VII. ARGUMENT

Rejection Under 35 U.S.C. § 103(a) Over Kramer In View Of Fulton is Improper.

Independent Claims 59, 67, and 78, and the claims dependent therefrom, are not obvious over Kramer in view of Fulton. To establish a prima facie case of obviousness, three criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Second, there must be a reasonable expectation of success. Finally, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based upon Appellant's disclosure. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Appellant respectfully submits that none of the three above-described criteria have been met in the present case, and in support provides the following remarks.

The References Do Not Teach or Suggest All Claim Limitations

Kramer in combination with Fulton does not teach or suggest all of the claim limitations of Claims 59, 67 and 78, which is a requirement to establish a *prima facie* case of obviousness.

Claims 59, 67 and 78 each relate to a method of fluid distribution. Appellant respectfully submits that neither Fulton nor Kramer discloses or suggests the element of fluid distribution. Kramer discloses a method of filtering. Fluid distribution is not the same as, nor equivalent to, or inherent in, filtering. Fluid distribution involves resubdividing, a plurality of times, an incoming fluid stream into multiple smaller fluid streams so that the incoming stream is

distributed, i.e., spread across, the fluid entry cross section of a reactor bed in a uniform manner. (see Appellant's Application, ¶ [0055]). This uniform fluid distribution occurs in addition to, and not because of, any filtration that may also be occurring.

Kramer does not teach or suggest that its guard bed particles have any fluid distribution properties. Kramer only teaches that the particles can be used for traditional filtration purposes, i.e., removing suspended solids of greater than 10 microns in diameter, preferably iron sulfide, from mixed phase gas-liquid-solid streams (see Kramer, col. 3, lines 8 – 15). Kramer is tailored to correcting a specific problem in the petroleum processing industry, namely filtration-based removal of solid materials. This filtration process would not necessarily result in fluid distribution, and in particular would not produce uniform fluid distribution across the cross section of the bed as achieved by the present invention. Solids filtration is clearly distinguishable from, and does not make obvious, gas and liquid fluid distribution as claimed in the present invention.

Claims 59, 67, and 78 each also describe and claim the feature of subdividing an organic-based feed stream into a plurality of smaller fluid streams by passing the organic-based feed stream through one or more of a plurality of fluid flow passageways. An embodiment of Appellant's invention involves the use of ceramic filter units with openings, wherein the particular fluid in the reactor not only passes around the ceramic filter units, but also <u>through</u> at least some of the units via the plurality of fluid flow passageways created by the openings in the units. In particular, the passageways comprise three or more passages surrounding a central passage.

Appellant respectfully submits that this feature is not disclosed or suggested in Kramer or Fulton. Kramer sets forth that alternative shaped guard bed particles can be used. (see Kramer, col. 4, lines 1 – 4). However, every example in Kramer utilizes a sphere or a cylinder, with the sphere being the particle shape of choice. There is no teaching or suggestion that ceramic filter units with openings, and specifically with three or more passages surrounding a central passage, could be utilized, or that such a configuration would be beneficial. Without this specific arrangements of openings claimed in the present invention, the particles disclosed in Kramer would not provide the subdivided flow required to uniformly distribute the organic-based feed stream across a catalyst bed to prevent channeling and other deleterious consequences.

Claims 59, 67, and 78 each also describe and claim the use of elliptical openings. Appellant respectfully submits that neither Kramer nor Fulton teaches the use of elliptical openings, or recognizes the advantages that this shape of opening provides. The Primary Examiner contends that Fulton teaches circular openings, and that the "broadest reasonable definition of an ellipse includes a circle" (Final Office Action, p. 3, lines 8-9); however, Appellant is not claiming "circular openings," but only "elliptical" openings. Furthermore, Appellant's elliptical shaped openings provide improved fluid distribution properties when compared to circular openings (see No Reasonable Expectation of Success section below), which indicates that elliptical openings and circular openings are indeed distinguishable from each other, both in shape and results achieved. Also, the spaces around and between the particles in Kramer would eventually become plugged with solids, while the elliptical openings in the ceramic units of the present invention would continue to allow fluid flow through the ceramic units, which results in uniform fluid distribution throughout the packed bed.

No Reasonable Expectation of Success

There must be a reasonable expectation of success in order for the prior art to be modified or combined to reject claims as *prima facie* obvious. *See In re Merck & Co., Inc.*, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Neither Kramer nor Fulton indicates or suggests that Appellant's claimed invention would have a reasonable expectation of success.

To the contrary, Appellant's use of ceramic units with elliptical openings unexpectedly results in advantageous results when compared to prior art materials. To support this assertion, Appellant submitted a declaration from the inventor John N. Glover in the Amendment and Response to Office Action filed November 5, 2003. (See Section IX – Evidence Appendix). This declaration sets forth the following pertinent information:

(a) Appellant performed experiments comparing the ceramic filter units of the present invention with prior art ceramic filter units that are structurally similar to guard bed particles/catalyst pellets such as those found in Fulton and Kramer.

(b) Appellant's use of the ceramic units of the present invention unexpectedly resulted in advantageous fluid distribution properties, such as improved horizontal fluid distribution and significantly decreased pressure drop across a filter bed.

(c) The use of elliptical openings advantageously provided additional flow control parameters, i.e., the ability to vary the major and minor axes of the elliptical openings, when designing the ceramic units.

(d) The Assignee of Appellant has enjoyed substantial commercial success from the sale of the ceramic units of the present invention, which should be considered indicative of the fact that the ceramic units have met a long felt, unfilled need in the relevant industry.

No Suggestion or Motivation to Combine References

Finally, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings, *assuming arguendo* that the references contain the specific teachings of Appellant's claim limitations directed to fluid distribution and elliptical openings.

"[The] teachings of references can be combined *only* if there is some suggestion or incentive to do so." *See In re Fritch* 23 U.S.P.Q. 2d 1780, 1783 (Fed. Cir. 1992) (emphasis in the original). "The mere fact that the prior art may be modified in the manner suggested by the Primary Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *See id* at 1783-84. Further, a person of ordinary skill in the art must have some motivation to combine the reference teachings *in the particular manner claimed. See, e.g., In re Kotzab*, 55 U.S.P.Q 2d 1313, 1317 (Fed. Cir. 2000) (stating that "[p]articular findings must be made as to the reason the skilled artisan, with *no knowledge* of the claimed invention, would have selected these components for combination in the manner claimed." (emphasis added).

Appellant respectfully submits that one of ordinary skill in the art would not be motivated to combine the teachings of Kramer and Fulton to create Appellant's claimed invention. The Primary Examiner has attempted to piece together Appellant's claimed invention from Kramer and Fulton using a hindsight reconstruction of the prior art, which is impermissible.

For example, Appellant claims a method of flow distribution. The Primary Examiner does not specifically identify the motivation for one skilled in the art to modify the filtration units in Kramer to provide openings that achieve enhanced flow distribution. Flow distribution is an entirely different function from filtration. In fact, one skilled in the art would not seek to add a plurality of openings to the guard bed particles taught by Kramer, because this would diminish the effectiveness of these particles in filtering solid materials. That is, adding openings to the particles would allow more solids to pass through the particles, which is contrary to the intended purpose of the invention.

Further, Appellant claims a central opening in the cylindrical unit, and a plurality of other openings surrounding the central opening. The Primary Examiner does not specifically identify the motivation in either reference for one skilled in the art to combine the references to produce these features. Kramer does not teach these features at all, and merely sets forth the open-ended statement that the "particles can be in other configurations." (Kramer, col. 4, lines 1 – 4). Fulton teaches a unit with openings therein, but only as an example of "the almost limitless varieties possible." (Fulton, p. 97). These types of broad, generalized statements in the references are insufficient to provide specific motivation to one skilled in the art to combine the references. Only improper hindsight reconstruction would lead one to believe otherwise.

Even further, the Appellant claims elliptical-shaped openings. The Primary Examiner does not specifically identify the motivation for one skilled in the art to take the step of making the plurality of surrounding openings elliptical in shape. In fact, the words "ellipse" or "elliptical" are never used, or even suggested, in either reference.

The Primary Examiner has not set forth the *prima facie* elements necessary to show why one with ordinary skill in the art would be motivated to combine the Kramer and Fulton references to provide the missing elements of the current invention.

Argument Summary

Neither the references alone, or in combination, teach or suggest each and every element of independent claims 59, 67, or 78, or the claims dependent therefrom, which is required to establish a *prima facie* case of obviousness. There is no reasonable expectation of success in combining the references to produce Appellant's claimed invention, which is another requirement to establish a *prima facie* case of obviousness. Lastly, there is no suggestion or motivation to combine reference teachings, *assuming arguendo*, that the references even teach Appellant's claim limitations, as also required to establish a *prima facie* case of obviousness.

Conclusion

For the foregoing reasons, it is submitted that the Primary Examiner's rejections of claims 59, 61-67 and 69-85 are erroneous, and reversal of the Primary Examiner's decision is respectfully requested.

Please charge any required fees, including but not limited to the Appeal Brief filing fee of $250 and a one month extension of time fee of $60, and credit any overpayments, to the Deposit Account of Bracewell & Giuliani LLP, Deposit Account No. 50-0259 (attorney docket no. 020781.04).

Respectfully submitted,

Date: 3/13/06

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VIII. CLAIMS APPENDIX

A copy of the claims presented in this appeal is included below.

Claim 59. A method of fluid distribution in a chemical reactor comprising the steps of:

providing a layer of a plurality of ceramic filter units, at least some of the ceramic filter units including a body having a substantially annular outer peripheral shape, a central opening extending through the body, and at least three elliptical openings extending through the body and positioned between the central opening and an outer periphery of the body so that a combination of the central opening and the at least three elliptical openings define a plurality of fluid flow passageways extending through the at least some of the plurality of ceramic filter units;

contacting an organic-based feed stream with the layer of the plurality of ceramic filter units; and

subdividing the organic-based feed stream into a plurality of smaller fluid streams by passing the organic-based feed stream through the plurality of fluid flow passageways prior to the organic-based feed stream contacting a catalyst bed in the chemical reactor.

Claim 61. A method as defined in claim 59, further including the steps of: removing contaminants from a contaminated organic-based feed stream; and providing a decontaminated and uniformly spread organic-based feed stream to a catalyst bed for further processing in the chemical reactor.

Claim 62. A method as defined in claim 59, including the step of packing the ceramic filter units into the chemical reactor with a packing factor of about 200 to 500 ft2/ft3.

Claim 63. A method as defined in claim 59, including the step of packing the ceramic filter units in graduated layers into the chemical reactor with each layer having a different packing factor of about 200 to 500 ft2/ft3.

Claim 64. A method as defined in claim 59, wherein the body of at least one of the plurality of ceramic filter units has a fluted outer peripheral surface.

Claim 65. A method as defined in claim 59, wherein the outer peripheral includes a plurality of recessed notches extending inwardly from the outer periphery towards the medial portion of the ceramic filter unit.

Claim 66. A method as defined in claim 59, wherein the at least three elliptical openings substantially surround the central opening between the central opening and the outer periphery to thereby define a ring around the central opening.

Claim 67. A method of fluid distribution in a chemical reactor comprising the steps of:

providing a layer of a plurality of ceramic filter units, at least some of the ceramic filter units including a body having a substantially polygonal outer peripheral shape, a central opening extending through the body, and at least three elliptical openings extending through the body and positioned between the central opening and an outer periphery of the body so that a combination of the central opening and the at least three elliptical openings define a plurality of fluid flow passageways extending through the at least some of the plurality of ceramic filter units;

contacting an organic-based feed stream with the layer of the plurality of ceramic filter units; and

subdividing the organic-based feed stream into a plurality of smaller fluid streams by passing the organic-based feed stream through at least some of the plurality of fluid flow passageways prior to the organic-based feed stream contacting a catalyst bed in the chemical reactor.

Claim 69. A method as defined in claim 67, further including the steps of: removing contaminants from a contaminated organic-based feed stream; and providing a decontaminated and uniformly spread organic-based feed stream to a catalyst bed for further processing in the chemical reactor.

Claim 70. A method as defined in claim 67, wherein the outer peripheral includes a plurality of notches recessed from the outer peripheral towards the medial portion of the ceramic filter unit.

Claim 71. A method as defined in claim 67, including a step of utilizing ceramic filter units wherein the outer periphery has a polygonal shape with a length of about 1/8 inches to about 3 inches.

Claim 72. A method as defined in claim 67, wherein the body of at least one of the plurality of ceramic filter units has a substantially polygonal shape selected from the group consisting of triangles, quadrilaterals, squares, rectangles, pentagons, hexagons, heptagons, and octagons.

Claim 73. A method as defined in claim 67, wherein the body of at least one of the plurality of ceramic filter units has a square shape with a width of about ¼ inches to about 3 inches.

Claim 74. A method as defined in claim 67, wherein the body of at least one of the plurality of ceramic filter units has a rectangular shape with a length of about ¼ inches to about 3 inches and a width of about ¼ inches to about 3 inches.

Claim 75. A method as defined in claim 67, wherein the body of at least one of the plurality of ceramic filter units has a closed-planed shape with a width of about ¼ inches to about 3 inches.

Claim 76. A method as defined in claim 67, wherein the outer peripheral includes a plurality of recessed notches extending inwardly from the outer periphery towards the medial portion of the ceramic filter unit.

Claim 77. A method as defined in claim 67, wherein the at least three elliptical openings substantially surround the central opening between the central opening and the outer periphery to thereby define a ring around the central opening.

Claim 78. A method of fluid distribution in a chemical reactor comprising the steps of:

providing a layer of a plurality of ceramic filter units, at least some of the ceramic filter units including a body, a central opening extending through the body, and at least three elliptical openings also extending through the body and positioned between the central opening and an outer periphery of the body so that a combination of the central opening and the at least three elliptical openings define a plurality of fluid flow passageways extending through each of the plurality of ceramic filter units;

contacting an organic-based feed stream with the layer of the plurality of ceramic filter units; and subdividing the organic-based feed stream into a plurality of smaller fluid streams by passing the organic-based feed stream through the at least some of the plurality of fluid flow passageways prior to the organic-based feed stream contacting a catalyst bed in the chemical reactor.

Claim 79. A method as defined in Claim 59, wherein the central opening is circular.

Claim 80. A method as defined in Claim 67, wherein the central opening is circular.

Claim 81. A method as defined in Claim 78, wherein the central opening is circular.

Claim 82. A method as defined in Claim 64, wherein the fluted outer peripheral surface of the at least one of the plurality of ceramic filter units has sharp edges.

Claim 83. A method as defined in Claim 65, wherein at least one of the recessed notches of the outer periphery has sharp edges.

Claim 84. A method as defined in Claim 70, wherein at least one of the notches recessed from the outer periphery has sharp edges.

Claim 85. A method as defined in Claim 76, wherein at least one of the recessed notches on the outer periphery has sharp edges.

IX. EVIDENCE APPENDIX

This Appendix includes a copy of a declaration submitted by inventor John N. Glover in the Amendment and Response to Office Action filed November 5, 2003.

X. RELATED PROCEEDINGS APPENDIX

None.